The EXCAVATING ENGINEER

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With the Wussow Contracting Company in Milwaukee

C. F. Wussow Keeps Three Shovels on the Job Constantly, Handling All Types of Excavation

WHEN C. F. Wussow of the Wussow Contracting Company puts his shovels, his trucks, his men and the whole organization to work he keeps them busy. His contracts are always finished ahead of the scheduled time, and the minute one job is finished he moves on to another without a moment wasted. To have followed this company about Milwaukee this past

Taking Out the First Lift along the North Side of the Job at North and Farwell Avenues.

year would have kept one busy. They have had three shovels at work constantly on both large and small jobs, sometimes two machines on the same job, sometimes on different jobs at opposite ends of the city.

Making Excavation for North Avenue Theatre

One of the most interesting contracts which this company completed during the summer was the basement excavation for a new million-dollar theatre on the northeast side of the city at North and Farwell Avenues. The excavation was in the shape of an "L," the apex pointing in from the corner. This job involved the moving of a little over 25,000 cubic yards, consisting mostly of a heavy clay, and in one corner an old reinforced concrete foundation had to be taken out. The average depth of excavation was thirteen feet, with a maximum of a little over seventeen feet six inches on one side.

The work was handled in two lifts, the first cut being made about 25 feet wide, running east and west along the north side. This was carried out with a new Bucyrus 31-B one-yard shovel, a machine which was purchased in the spring. It worked one ten-hour shift per day and handled about 900 cubic yards per shift. A fleet of twelve trucks, including both Mack and Sterling, served the shovel, coming into the job through an alley, and running up to the machine on top the bank. The spoil was hauled to the shores of Lake Michigan, a distance of several blocks, and was used for filling in at Lake Park.

The machine then worked back and forth taking cuts toward the south side, until it got down to where the last cut of the first lift was to be taken out. A Bucyrus 20-B was then brought on to the

The 1-yard machine with a high-lift extension, taking out the last few dipper loads on the basement job for the new theatre.

Left — Breaking an opening through the reinforced concrete wall, so that the shovel could get inside and dig out the debris.

Below — The 1-yard machine working on the second lift, and the small machine working with the wall which gave so much trouble. The workmen in the foreground are preparing to use an acetylene torch on the steel reinforcing.

job, which up until then had been working on another job in another part of the city. The two machines were then put to work side by side on this last cut.

Reinforced Concrete Wall Offers Problem

When the first lift was finished, the one-yard shovel started on the second lift by making a cut along the east side running north and south. The ¾-yard shovel was put to work on the reinforced concrete wall, which was in a corner and formed a square about 25 or 30 feet across, filled with broken concrete, rock and trash. The reinforced concrete meant some hard work. Drills were put to work in breaking the wall down on one side. Quite a problem was encountered here, and as a first resort a large steel ball was fastened on the boom of the shovel by means of a hook and trip. The ball broke up the concrete a little, but the method was not very successful, since the steel reinforcing held it together so strongly. Finally drills were put to work on the east side of the wall and acetylene torches to cut the steel reinforcing. By this means a hole was cut wide enough to allow the shovel to pass through and dig out all the material inside. This left the wall standing alone, which in this condition was very easy to break up and load out.

After this wall was taken out the ¾-yard machine went to work helping the 1-yard shovel excavating the second lift. In this work the larger machine handled about 700 yards per shift, working one ten-hour shift per day. The small machine handled about 600 yards per shift. When the second lift was finished, the 1-yard machine was left to finish the job alone. The remaining work consisted of digging to a 17-foot 6-inch level on the south side. For this part of the work a high lift extension was put on the boom, that the trucks might be filled on the bank rather than go to the trouble and expense of building a ramp. While the shovel was still digging, taking out the last of the dirt on the south end, construction work was started on the north end. Forms were going up, concrete mixers were grinding away, cement carts were rattling down the board walks and the new million-dollar theatre was started. The Wussow organization as usual finished this contract in good time, starting work on July 9th and finishing in a month's time.

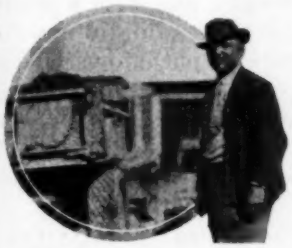
A Large Basement Excavation

When the theatre job was finished the Bucyrus 20-B shovel was already well started on another job, and the 31-B was taken far out on the north side of the city on another job.

The work which the smaller machine did was another basement excavation job at the corner of Van Buren and Mason Streets. At this site a new ten-story building for the Meyer-Rotier-Tate Company will be erected. This is to be a modern office building, with the ground floor designed for store space.

Carl Kelly, Operator of the ¾-yard Machine and Bob Burbach, Operator of the 1-yard Machine.

The yardage excavation involved here was a little over 5600 cubic yards, consisting of clay and common; digging carried to a depth of twelve feet. The shovel averaged 840 yards per day on this job. Seven trucks were serving the machine, including three Macks, three Sterlings and one Federal. Here as with the other job the material was hauled to the lake front for filling in at the beach. The trucks were run in on a plank ramp at the west side of the excavation.



Harvey Wussow, Son of C. F. Wussow, Who Superintends a Great Deal of the Work for the Company.

While the shovel was taking out the last few loads the foundation contractor was well started placing his forms, a Rex mixer mounted on a Ford truck was working away, and concrete was being poured.

Grading on the Fairmont Park Subdivision

In the meantime the 1-yard shovel was busy doing some grading work out near Hampton Road on the Fairmont Park Subdivision, which is being sponsored by the Weber-Fleming Realty Company.

The lead-in street to the subdivision was cut north and south, leading off of Hampton Road. From this streets were cut back into the subdivision running west. As the ground lay, without any grading the entire west side was much lower than the east side. On the east side of the main street, however, there was a long low mound which formed the crest of a hill overlooking a little gully and cutting off the view from the subdivision toward the east. By the moving of this mound the view would be cleared, and the earth could be used to fill in the low lots at the west side of the area. The leveling of this mound then was the work of the shovel.

The digging was fairly easy going, the material consisting of loose clay and common. The shovel was served by three trucks, consisting of one Mack and two Sterlings. Even though the length of haul was only about 150 to 200 yards, and there was no stall in dumping, the trucks had to hurry and most of the time were behind the shovel.

As the material was dumped, a team and small scraper kept it leveled to a depth of about three feet, which depth was necessary to bring the low part up to the correct level.

Bob Burbach is the regular operator on the one-yard machine, and Carl Kelly is the operator on the ¾-yard machine. Mr. C. F. Wussow and his son, Harvey Wussow, supervise a great deal of the work personally, and are usually out on the job with the rest of the organization.

The H. Schmitt and Sons Corp. were the contractors for the theatre building and Robert Reisinger Co., Inc. were contractors for the new Meyer-Rotier-Tate Building.

The Wussow organization moved about 175,000 yards during the year of 1926 using two machines and part of the time three machines. Their work consisted of cellar excavation, plotting of subdivisions and street and road grading. This year they are in a position to handle as much as 250,000 yards and are ready to furnish bids for all large projects.

C. F. Wussow of the Wussow Contracting Company

"For Goodness Sake!"

It was pouring down rain, and the clock in the steeple had just struck midnight, when there came a timid ring on the front door. The mother hurried down the stairs.

There on the porch stood her daughter, drenched to the skin, her bobbed hair lying in short, wet ropes on her forehead. Cold and blue and shivering the girl was crying pitifully.

"Where on earth have you been?" asked the mother.

"Walking," answered the girl with a sob.

"Walking?" repeated the mother. "Walking how far?"

"Twenty miles," the girl whispered tearfully.

"For Goodness sake! ! !" screamed the mother.

"Yes," replied the girl.

"Dad, here comes a gang of girls up the road dressed in funny pants."

"What! Knickers?"

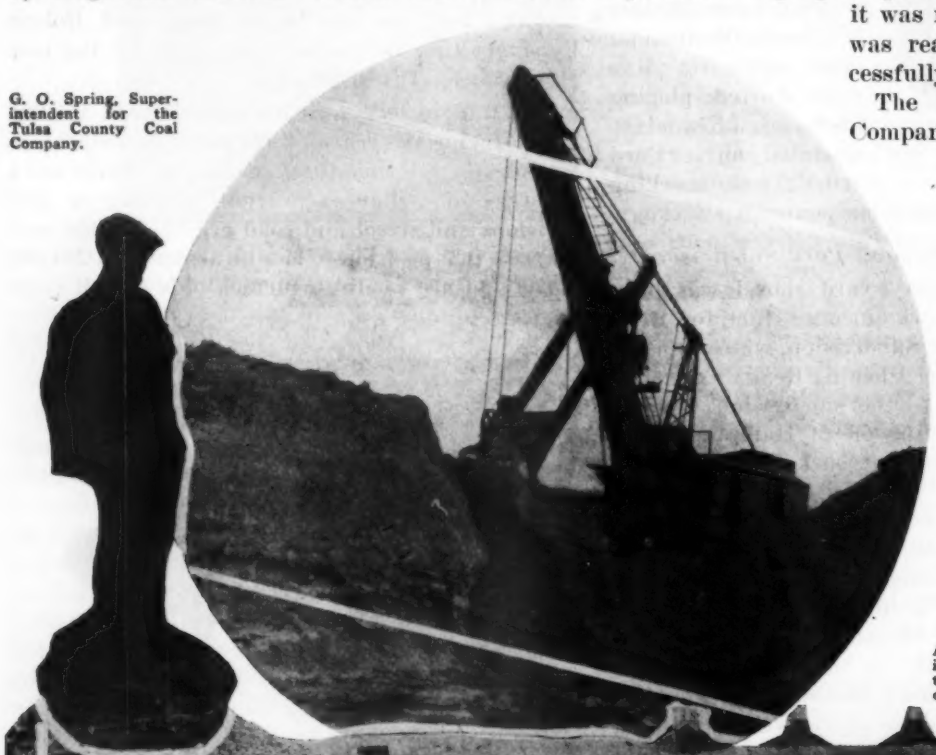
"No, Pa — they're white folks."

Operations of the Tulsa County Coal Company

This Company Is Operating Two Strip Mines Near Collinsville, Oklahoma, Using a 2½-Yard Electric Shovel and a 6-Yard Steam Shovel

THE industry of coal stripping is of such a nature that its development has been entirely dependent upon the development of adequate machinery. It is now and has been for some years an established and successful industry, whereby vast coal deposits lying close to the earth's surface may be extracted for commercial use — deposits that were formerly left untouched by large-scale methods because there were no economical means of extracting them. It has been through the development of the huge coal-stripping shovels, with dippers ranging in size up to 10 cubic yards, that these beds near the surface have been mined economically, and with a profit to the operators. The first successful, full-revolving, coal-stripping shovels were put into use about the year 1910. There were, of course, stripping operations in progress previous to that time, but it was not until then that it was really carried out successfully on a large scale.

The Tulsa County Coal Company is numbered among those of the newly organized that have taken advantage of the development of adequate machinery, and are operating two mines in Oklahoma near Collinsville with great success. They have built up a capacity business during the four short years since they were organized.



G. O. Spring, Superintendent for the Tulsa County Coal Company.

A closeup of the electric shovel in action, working along on top the coal seam. Note the depth of overburden.

Looking down a cut. Empty wagons going along on top of the seam to where the coal is being barred loose.

The company was organized in October, 1922, and the officers are: Fred W. Insull, President; L. Russel Kelce, Treasurer and General Superintendent; and G. O. Spring, Superintendent. They control approximately 500 acres of strippable coal surface divided into 2 sections, called Mine No.1 and 2.

Two Views of the 2½-yard Electric Coal-Stripping Machine at Work in the Cuts.

Prospecting and Making Analysis of the Coal

In order to ascertain the extent, thickness and analysis of the coal bed and the character of overburden, the entire property was prospected with well drills, holes squared about three hundred feet apart. From these tests we are given the following analysis of the coal:

Moisture	4.0
Volatile	38.0
Carbon	54.3
Ash	6.0
Sulphur	3.1
B. T. U.	14,000

The thickness of the coal seam was found to vary from 16 to 20 inches, lying under overburden which varied in depth from 17 feet to 38 feet. The overburden is made up of varied materials, consisting of about four feet of slate directly over the coal, then a band of crystalized sandstone varying from 14 to 18 inches in thickness, then about 14 feet of tough blue shale, and a top layer of clay, gravel and sandy loam.

Stripping Off the Overburden

At Mine No. 1, the first mine opened by the company, ground was broken in November 1922, taking off the overburden. When operations were first started a Marion 37 one-yard shovel was used for stripping. After one year's operation the overburden was found too deep for the shovel in use, so a Bucyrus 80-B was installed. This machine, mounted on caterpillars, equipped with a 2½-yard dipper, is operating three eight-hour shifts per day, six days a week. The average output for the shovel is about 1400 cubic yards per shift or 4200 yards every twenty-four hours.

The pit at present is about one mile long; the average width of clean up at bottom is thirty-one feet at the twenty-six-foot depth and thirty-five feet at the seventeen-foot depth. Only about one-half the pit has to be blasted. Where this is necessary, holes are drilled with a well drill about 28 feet apart, and from one and a half to five kegs of black powder are used per hole. Atlas, Hercules and du Pont powders are used. In making the cuts they are working away from the crop line, operating the pits in as nearly a straight line as possible, allowing gradual outside curves for the deeper stripping.

Loading Out the Coal

All coal from the plant is loaded by teams, using the tapering face method, which makes possible a loading capacity of three hundred and twenty-five tons for nine hours in a pit only thirty-two feet wide. The coal seam is 16 inches thick, and is barred loose at the face, this method being

more satisfactory than the old pin method. Holes are drilled twenty-eight inches apart with hollow piston drills, then thirty-pound coal bars are inserted in these holes and the coal pried loose. The drills used are two Sullivan hollow piston rotators and one Ingersoll-Rand of the same type. Air is furnished by a Westinghouse Air Brake Company locomotive-type compressor. With this method eight men keep the coal broken loose, the face clean, and do all incidental pit work necessary to load three hundred tons a day.

TheHome-Made Hoist in Action, Pulling a Wagon Up Out of the Pit.

At the Railroad Sidings, Loading the Cars from the Wagons.

Home-Made Hoist Used to Draw Wagons Out of Pit

Wagons are used exclusively for hauling the coal from the pit to the railroad sidings. In getting the wagons up out of the pit, a home-made hoist is used as shown in one of the illustrations. This was made from an old steam-driven friction drum hoist with a 20-inch drum, removing the steam engine and installing a 15 h.p. motor geared to the intermediate hoist gear, and this in turn to the main hoist gear. It is assembled on eight-inch "I" beams with ½-inch boiler plate for top floor. Underneath is riveted a ½-inch plate with front and back bent upwards, making a skid with solid bottom for moving. Coal is loaded direct from wagons into railroad cars, no tipple being in operation at the present time. Mine run and lump are the only two grades loaded.

Mine No. 1 is now entirely electrical, electricity being supplied over 35 miles of line by the Sand Springs Power Company's plant. Power delays have been reduced to an average of about fifteen minutes a week.

Barring the coal loose and loading it into wagons. L. Russel Kelce, Treasurer, and G. O. Spring, Superintendent, at right.

Mine No. 2

Mine No. 2, located directly north of Mine No. 1, was opened in 1910 by another company, who at first operated it by team stripping. They installed a large steam shovel in September 1918, a Bucyrus 225-B. About the middle of 1926 the Tulsa County Coal Company took over the mine, calling it the No. 2 or "North" mine. Conditions here are very much the same as in Mine No. 1, that is, nature and depth of overburden, thickness of coal seam and analysis of coal.

Stripping the Overburden

The overburden like that of the other mine is of such a nature that it is necessary to keep a blasting crew ahead of the shovel at all times. Holes

Another View of the Electric Shovel Busy Stripping Off the Overburden.

are drilled diagonally from each other about thirty feet apart, and carried to within 18 inches of the coal seam. These are sprung and shot with from six to eleven kegs of black powder. Atlas, Hercules and du Pont powders are used, and the drills used are home-made. To date a little over forty acres of the pit has been opened, or about one-fourth of the property included at this mine. In making the cuts they are working away from the crop line, making approximately east and west cuts. The shovel is making cuts averaging in depth from 22 feet to 38 feet, and in width from 60 feet to 75 feet. It is working two nine-hour shifts per day, an average of 2900 cubic yards per shift or 5800 yards in eighteen hours. All of the material is overcast alongside the cuts. The fuel consumption per shift is about 7½ tons, and water is obtained from surface ponds and a creek near by.

Breaking Out and Loading the Coal

The coal is drilled with Sullivan and Ingersoll-Rand rotators, with air furnished by Westinghouse Air Brake Company's locomotive-type compressors. It is then broken loose by the use of bars, and loaded into wagons as in the other mine. The length of haul from the coal bed to the railroad sidings varies from 300 yards to three-quarters of a mile. At this mine a wagon dump tipple is in use, consisting of a gradual incline from ground to hopper, which is built fourteen feet above the ground. Above the hopper an incline was built with a sixty-degree slope. The end gates are opened at the hopper, and as the wagons move up all the coal slides out, leaving them clean. Mine run only is loaded out at this mine, averaging about 300 tons per day. The sidings for shipping facilities are on the Santa Fe railroad.

The Tulsa County Coal Company is a rapidly growing concern. They have been in business less than four years, started out in a small way with one small stripping shovel and now are operating two mines with large stripping shovels, doing a capacity business.

Keep a Camera on the Job

Much Advantage May Be Gained by the Contractor Who Makes the Taking of Pictures a Habit

Perhaps the most valuable use of a camera, as a part of the contractor's equipment, is in creating an indisputable record of the condition of the work and the surrounding property during the various stages of completion, for use when the job is over.

This photographic record is of value in two ways. First, for evidence in possible law suits after the work is over. Photographs will either support or disprove any condition of damage to property, for a succession of photographs will show the conditions before, during and after the job.

Another way in which pictures prove of value is the recording of conditions and methods of operation for use in planning and carrying out future business.

Progress pictures are not difficult to obtain. They can either be purchased from commercial photographers who will be found in most of the medium-sized cities, or someone on the job, who knows which end of the camera to point toward the work, can be pressed into service to take pictures from pre-determined positions, at regular intervals. The camera does not need to be elaborate, nor does it need to be a large one — if detail is desired, make a few "closeup" pictures.

These are the advantages which were pointed out in a recent article in the *Contract Record and Engineering Review.*

We would like to add another very valuable use to this list of possible ways to employ construction pictures.

The average contractor is not able to spend much time or money upon advertising, and yet it is quite essential that he be well known and favorably known if he is to be successful. One way,

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The EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

REGULAR SUBSCRIPTION: $1.00 a year for 12 numbers.
SPECIAL SUBSCRIPTION: Upon application on card inserted in this number, subscriber's name will be placed on Rotating List, whereby he will receive The Excavating Engineer frequently (not regularly) free of charge.

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Business Resume

The National City Company in their January report *"Business Conditions"* give the following summary of conditions in the building industry:

Building construction has been heavy throughout 1926, but the margin of gain over a year ago has been steadily narrowing and towards the close of the year there has been a tendency for the figures to fall somewhat under those of 1925. Measured in terms of permits issued in the leading cities, the year's building total will apparently fall some $300,000,000 short of last year, but these figures are not wholly representative, in that they do not include such important engineering projects as road construction, bridge building, etc., and are limited also to construction work within incorporated city limits. Building contracts, which cover this other construction, promise to run some $200,000,000 or $300,000,000 in excess of 1925. Following is a table giving comparative figures on contracts awarded each year since 1919:

BUILDING CONTRACTS AWARDED
(In Millions of Dollars)

	Amounts Awarded	Per Cent Increase
1919—27 States	2,580	
1920	2,565	— 0.6
1921	2,335	— 8.2
1922	3,344	+42.0
1923	3,504	+ 4.8
1923—36 States	3,990	
1924	4,479	+12.3
1925	5,821	+30.0
1926—(December estimate)	6,100	+ 4.7

The latest figures on contracts, which were for November, exceeded those of a year ago by a small margin. The following table, however, suggests that changes are taking place in the character of construction work. Residential building, which for so long showed the biggest gains, was in 1926 about even with a year ago, and the largest increases were in industrial building and public works and utilities.

	11 Mos. 1925	11 Mos. 1926
Commercial Buildings	$ 767,903,800	$ 845,694,300
Educational Buildings	381,558,200	358,900,600
Hospitals and Institutions	96,279,100	116,484,600
Industrial Buildings	433,409,000	621,323,100
Military and Naval Buildings	5,819,900	8,540,900
Public Buildings	42,571,700	52,064,700
Public Works and Public Utilities	793,819,400	987,808,000
Religious and Memorial Buildings	139,467,300	132,353,600
Residential Buildings	2,421,774,000	2,467,154,200
Social and Recreational Buildings	228,347,600	222,194,900
Total	$5,310,950,000	$5,812,518,900

Road building and other large public projects loom large for the coming year, New York City alone proposing to spend millions in subway building and other improvements for the city and port. According to reports by wire to the Electrical World, the electrical utilities industry in 1927 expects to spend $958,000,000 for new equipment and plant, compared with $841,000,000 in 1926 and $721,000,000 in 1925. A glance at the real estate supplements of the Sunday press does not indicate any backwardness in the planning of new industrial and residential construction. Quite evidently the American people are still far from satisfied with their industries and cities as they are, and easy money and absence of any marked rise in building costs are having the effect of prolonging the building boom.

Building trades wages have continued their steady advance, the *Engineering News-Record* index of wages rising 6 per cent during the year to a new high level 148 per cent above 1913. Building materials prices, however, averaged somewhat lower, so that total construction costs advanced but slightly.

The new year opened with good prospects for continued prosperity. One business analyst has made the statement that 1925 plus 1926 divided by two equals 1927. It seems to us a little as if this were a pretty definite prophecy, possibly too definite. From all indications, however, the year is to be a good one.

Call money has persistently returned to the rate of 4¼ and 4½ in spite of fluctuations to higher points caused by calling large amounts. Time money as well as call money is plentiful.

The steel industry made a decidedly good record for itself in 1926. Steel corporation earnings the first three quarters totalled $145,502,216, the largest for any similar peace time period. The declaration for a 40 per cent stock dividend furnished

sensational evidence of the prosperity of the industry, for the earnings were not confined to the Steel Corporation but were general throughout the industry. Earnings of nine steel companies are shown in the following table:

EARNINGS OF 9 STEEL COMPANIES
(In Thousands of Dollars)

	1st 9 Mos. 1925	1st 9 Mos. 1926	Change	3rd Quarter 1925	3rd Quarter 1926	Change
U. S. Steel Corp.....	66,899	85,433	+	23,805	31,710	+
Bethlehem Steel Corp..	9,585	15,765	+	2,001	4,551	+
Youngstown Sheet & Tube Co.....	10,420	11,994	+	3,299	4,007	+
Inland Steel Co.....	3,449	5,034	+	1,189	1,701	+
American Steel Foundries	3,624	3,966	+	835	1,041	+
Republic Iron & Steel Co.	2,499	3,756	+	438	1,312	+
Wheeling Steel Corp...	2,720	3,583	+	1,126	1,295	+
Otis Steel Co.....	1,595	2,149	+	400	735	+
Colorado Fuel & Iron Co.	1,068	1,586	+	Def. 186	Def. 228	—

Despite the evidence on all sides that the American people have been spending money freely, they have made a better record for saving this year than they are generally credited with. Sales of life insurance during 1926 broke all previous records, the total for the year, without the month of December, amounting to 6.6 per cent more than for the corresponding period of the year before. Three million more persons owned savings deposits at the close of 1926 than at the beginning. The increase of $1,562,140,000 brings about a total savings of $211 per capita, a new high record. This increase in savings is very important, for the ability to save is a very important factor in keeping the business of the country going at a satisfactory rate. High savings, coupled with low stocks of merchandise held throughout the country and a general feeling of optimism, have started the new year with every promise of a very satisfactory volume of business, and today, coupled with other factors, promise substantial business not only in the immediate future but probably throughout the year.

Keep a Camera on the Job

(Continued from page 55)

and a comparatively easy way of keeping others in touch with what you are doing, is by the donation of pictures of your work to the trade papers that are devoted to your class of construction. Most of these class publications are more than anxious to receive pictures of your work. It may seem humdrum and uninteresting to you, but to the person not on your job it has a decided news value, and for you it has publicity value.

Keep a camera on the job. Take pictures regularly, and have it there to get a record of any unusual incidences. The taking of these pictures may save you many times the cost, and if the better ones are sent to the publications interested you will get much advantageous publicity which you would not get otherwise.

From THE MAIL BAG

Notes Received from Shovel Operators in the Field.

"The Excavating Engineer
Sirs:

I am very sorry to have missed any copies of your magazine, and would be very glad if you could forward the November and December numbers.

I wish I could send some interesting items for the magazine but have nothing at present. I am only doing the ordinary run of city excavation work, cellars, foundations and that class of work. Am using a 1-yard Erie caterpillar.

Yours,
O. E. CARPENTER,
Brooklyn, N. Y."

W. H. Robinson, mechanical and civil engineer, who was state engineer for North Dakota from October 1918 to April 1923, writes that he is now civil engineer of Williston, North Dakota, where plans have been completed for a $50,000 storm sewer, and where plans are under way for a forty-five-thousand-yard paving project.

"The Excavating Engineer,
South Milwaukee, Wis.
Kind Sirs:

Enclosed please find film of Bucyrus 70-C shovel working on Denver & Rio Grande construction work being done by Utah Construction Company. Jim Huff is juggling the levers, with C. L. Vaill on the

boom. Ed Harrington is rolling fog. The old mill is in the ring for many years to come. Your magazine would be appreciated. That film is from a small kodak. Will send a larger one as soon as I can get a larger camera.

Thankfully,
CHAS. L. VAILL."

FROM THE MAIL BAG — Continued

"Excavating Engineer,
South Milwaukee, Wis.
Dear Sirs:

As I just got my Excavating Engineer today and have been looking it over, I see where some of the old-timers have contributed toward the Mail Bag.

Here is something — if it is worth while printing. I myself have been in the shovel game since 1905 — was broke in on an old-style A Marion, and since then have craned and run pretty near everything in the make of steam shovels, Thompson, Barnheart, Bucyrus 55 and 65, and most of the later makes, railroad-types and whorleys, Osgoods, Eries, Thews, Vulcans, Atlantics and Victors, as well as draglines and clamshells and locomotives . . . ."

Respectfully,
*SHORTY DUNN."

*Mr. Dunn started operating in the same year that THE EXCAVATING ENGINEER was founded — in those days it was called "The Steam Shovel News." — *Ed.*

"The Excavating Engineer,
South Milwaukee, Wis.
Dear Sirs:

Enclosed you will find P. O. money order for $1.00 to renew my subscription to The Excavating Engineer, as I do not want to miss one copy of it.

I put in a long season from the beginning of March to last November, but it was very wet and muddy most all summer and fall, and made it very disagreeable for team work.

I was running both a Northwest dragline and shovel for Masinix & Walgrere of Calgary, Alberta, building a 25-mile extension on the Lacombe and North West Railway, a good deal of which was muskeg.

Yours respectfully,
OMAR LYON,
Alberta, Canada."

Arthur E. Olsen writes that he has been running a Marion shovel for the National Fireproofing Company of Keasbey, New Jersey.

DEVICES YOU OUGHT TO KNOW ABOUT

FWD Auto Company 3-Ton Truck Equipped with Rotary Snow Plow

The Four Wheel Drive Auto Company, Clintonville, Wisconsin, exhibited at the Good Roads Show at Chicago their Model B 3-ton truck equipped with rotary snow plow.

The FWD Truck with Rotary Snow Plow Attached

The rotary snow plow was designed for use on four-wheel drive truck. It is said that the plow will clear a space about 8 feet wide, and can be depended upon to work through drifts of its own height, and in extreme cases even deeper snow can be cleared. At an ordinary depth of snow, 8 to 10 inches, provided the snow is not heavy or frozen, this plow can be operated up to 12 miles an hour. Further information can be obtained from the manufacturer.

Improved Buckeye Backfiller

Nowadays a backfiller is also a light crane, with many uses. The new Buckeye Backfiller, made by *The Buckeye Traction Ditcher Company, Findlay, Ohio,* is an example of this trend in equipment.

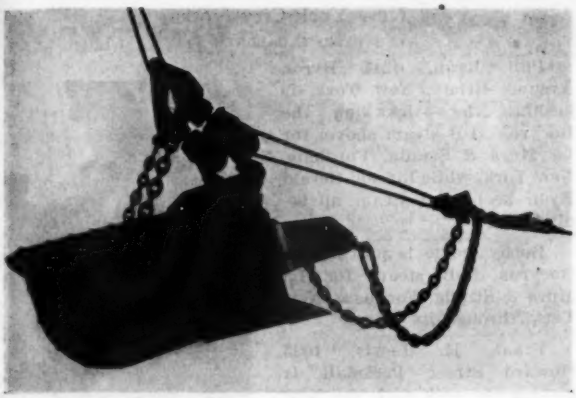
The Buckeye Backfiller

While it is primarily a backfiller, it can also be used to pull piling, handle pipe, batch boxes, forms, stone and steel. Equipped with a clamshell, it will handle all loose materials, and cleans up after excavation jobs. Its full-circle swing and adjustable length boom increase its adaptability. It has full-length alligator traction.

Another feature of this equipment is its control. All controls are located within easy reach at the operator's platform. The driver faces the work at all times. Any mechanic of average ability can produce efficient results on this machine.

New Hayward Dragline Bucket

The Hayward Company, 52-54 Church Street, New York City, have just announced a new Hayward drag-



The New Hayward Bucket

line bucket which will, like the other buckets in the company's line, be made in a variety of sizes from ¼-cubic-yard up. According to the manufacturer the new bucket needs very low head room in which to operate, making possible a higher spoil bank. The bucket has no rigid bales or bridles, and is of heavy construction. Pamphlets illustrating and describing this new bucket may be procured from manufacturer at the above address.

Spain Prohibits Use of Two-Wheeled Carts with Narrow Tires

To protect the good roads of central Spain, a royal decree has been issued to the effect that "Tires of carts must be widened within three years from a minimum of 3 centimeters for two-wheeled carts and 5 centimeters for the front wheels of four-wheelers to a maximum of 10 centimeters for two-wheelers and rear wheels of four-wheeled carts, according to their capacity."

FIELD NOTES

Saving Manila Rope in Pile Driving

The following suggestion is given in Public Works of the Navy: An officer attached to the Bureau of Yards and Docks recalls a pile driving job with which he was connected some years ago on which the cost of rope ran very high. The driving was difficult and the contractor was able to get down only three to eight piles per day. The pile driver was of ordinary drop-hammer type, using a 7-inch line for hammer runner. The cost for hammer runners ran up to some 50 cents per pile. This was in addition to the cost of time lost in reeving new lines. The contractor's superintendent suspected the rapid wearing out of the hammer runner to be due largely to the use of a head-block sheave of small diameter. He substituted an 18-inch sheave for the 12-inch that had been in use, and immediately cut his cost per pile, for hammer runner, from 50 cents per pile to 10 cents per pile.

Make Sure That Your Shovel Shows Parking Lights When You Leave It in the Street for the Night

Most contractors are very careful about warning their operators to never leave their sewer shovels on a public highway for the night without proper warning lights.

The importance of this cannot be overstressed, for if someone runs into an unlighted shovel the contractor is strictly liable. Oftentimes the rear end of the revolving frame hangs out beyond the caterpillars just above the zone lighted by the customary automobile headlights. It is thus very easy for a motorist to collide with such overhanging parts, unless they are properly marked by red lanterns.

SHOTS FROM THE FIRING LINE

Iowa Notes

BY H. C. EMERY

With a total bid of $378,478.69, or an average of $26,139.64, the Harrison Engineering Company of Kansas City have been awarded the contract for paving 15.8 miles of road in Johnson County, Iowa. Nine concerns submitted bids. The Harrison Company bid for the paving is $175,000 under the estimated cost when the highway improvement program was passed last year.

125 contractors, representing various sections of Iowa and Nebraska — members of the Central Branch of the Associated General Contractors — attended a two-day meeting in Des Moines on January 5th and 6th. Various phases of the contractor's problem were discussed, and the meeting was one of the most successful ever held in this section.

J. G. Miller & Sons of Waterloo were awarded the contract for the construction of a new Orpheum theatre at Waterloo. The excavation will start as soon as weather conditions will permit.

The Dewey Portland Cement Company of Davenport are rushing their new plant at Buffalo, Iowa, to completion. They recently installed a Bucyrus 100-B electric shovel in their quarry.

Kansas Notes

BY A. M. SHEFFER

The mines in the Pittsburg, Kansas, coal mining district are all operating, but the mild winter up to the writing of this article has retarded the production considerably, and has also tended to keep the price of coal down.

The Stimson Construction Co. of Topeka, Kansas, were awarded contract by the city of Eldorado, Kansas, for Section 1 of the new water supply project. This involves about 128,000 yards of excavation.

SHOTS FROM THE FIRING LINE — Continued

The Bucyrus 50-B electric shovel that is being used by the Walker Coal Company near Pittsburg, Kansas, is being operated by R. P. Emmitt, one of the members of the firm, and is handling some very hard digging to the entire satisfaction of the owners.

Moving a 3½-Yard Shovel Across a River

The two pictures shown herewith will be of particular interest to those who have worked upon stripping shovels.

The Electricity Commission of Victoria operate very extensive brown coal mines near Yallourn, Australia, and use

considerable equipment. Their main open pit mine is on one side of the river, and it became necessary, a short while ago, to move one of their Bucyrus 175-B shovels across the Latrobe River to a working which long ago was worked

by hand and which is now known as "The Old Brown Coal Mine."

The illustrations show very clearly the manner in which the big shovel was moved across the river without dismantling it in any way.

Missouri Notes

BY M. J. WOODHULL

Superintendent Ray Bainter, of the Bainter Coal Co., Bronaugh, Missouri, is double shifting with his small revolving Thew on his strip property near Bronaugh.

The B. E. L. Coal Co. are double shifting their Bucyrus 50-B near Bronaugh. J. Bunstrand is pulling the levers on the day shift, and G. E. Schecks is on at night.

The Doubleday Coal Co., Moundsville, Missouri, are double shifting their Bucyrus 80-B. Warren Little is superintendent, John Garrett is day engineer and Tom Garrett, night engineer.

The Short & Moberly Coal Co., Fort Scott, Kansas, are double shifting, with Lloyd James operating days, and Ora O. Daugherty of Bronaugh, Missouri, as night engineer.

New York City Notes

BY R. T. GARDNER

Phil Ryan, 4241 Byron Avenue, Bronx, New York, is pushing the sticks on the Bucyrus 31-B steam shovel for La Mura & Strada, Fordham, New York, while his son Gerald Ryan keeps the steam up behind him.

Bobby Doyle is putting the Bucyrus 41-B steam for La Mura & Strada, Fordham, New York, through its paces.

Frank H. Lewis, 1025 Howard Street, Peekskill, is moving the rock with the New York Trap Rock Company's Bucyrus 120-B electric. E. J. McElroy takes turns at the levers on relief shifts.

Ira Tansey is operating the Northwest gas crane for Frank Cooney in Tarrytown, New York.

Pacific Coast Notes

BY P. H. BIRCKHEAD

Contract was awarded by the Tulare Lake Basin Water Storage District, Hanford, Kings County, to John Phillips, 637 Santa Ray Avenue, Oakland, who bid $.115 per cubic yard for construction of ditch, work involving 105,583 cubic yards earthwork.

Contract was awarded by California Highway Commission to Kaiser Paving Co., American Bank Building, Oakland, who bid $78,555 for 2.1 grading and surfacing with gravel or stone from Fernbridge to Loleta, Humboldt County. Engineer's estimate $121,174.

Contracts were awarded as follows by Bureau of Yards and Docks, Navy Department, Washington, District of Columbia, for dredging at the Naval Operating Base, including dredging to increase the depth and width of the channels adjacent to and at the Naval Operating Base, and includes also disposal of dredged material: (1) To Hawaiian Dredging Co., Honolulu, T. H., who bid $.79 per yard for Item No. 2 and $.49 per yard for Item No. 4; (2) To United Dredging Co., Woolworth Building, New York, New York, who bid $.330 per yard for Item No. 3 and $.30 per yard for Item No. 5, work involving a total of 9,600,000 cubic yards dredging.

Plans and specifications are being prepared by Engineering Commission of the Tri-County Highway District (Ventura County, Santa Barbara County, and Kern County) for the construction of 74 miles of road, 20 feet wide, maximum grade 6 per cent, highest elevation about 5300 feet, from the west side of Kern County to the County Road, to connect Maricopa, Kern County, and Carpinteria, Santa Barbara County. Work involves 1,778,000 cubic yards earth and rock excavation, 15 bridges, ranging in length from 20 feet to 720 feet. Estimated cost $1,195,800. The three counties will issue $500,000 jointly in bonds, balance to be paid by Federal and State Aid. Bids for the work will probably be taken in sections, bids to be called for in three or four months. Engineers are Chas. Petit, County Surveyor, Court House, Ventura; Owen H. O'Neill, County Surveyor, Court House, Santa Barbara; and J. R. Thornton, County Surveyor, Court House, Bakersfield.

Plans and surveys are being made by Bureau of Power and Light, 207 South Broadway, Los Angeles, for the construction of dam at Elizabeth Lake Canyon for storage and one-mile tunnel from the present tunnel down the Elizabeth Lake Canyon.

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No. 1 of a Series

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FACTOR IN THE PROGRESS OF THE WORLD

SHOTS FROM THE FIRING LINE — Continued

Plans and specifications are being prepared by the California, Arizona and Santa Fe Railroad Co., 80 Jackson Boulevard, Chicago, Illinois, for the construction of 15 miles of railroad extension at Beardsley, Maricopa County, Arizona.

Contract was awarded to Thos. Kelly & Sons, Inc., 896 Hillstreet Building, Los Angeles, who bid $541,234 for constructing concrete storm drains, reinforced concrete storm drains, cement storm drains, cement pipe and cast iron sanitary sewers in Verdugo Road from Avenue 37 to Crestmore Place, section of Verdugo Road and Galssell Avenue storm drain system.

Plans completed, bids soon by United States Reclamation Service, Denver, Colorado, for following works for Weber River Water Users Association, Salt Lake Basin Project; Dam — On the Weber River, near Town of Echo, earth embankment type, 125 feet high, containing 1,400,000 yards earth and gravel fill, outlet works through tunnel in left abutment, needle valves, etc; Railroad — Relocation of Union Pacific Railroad, to cost about $1,000,000; Canal — Construct Weber-Provo diversion canal.

Date for holding bond election to vote on issuing bonds in amount of $24,000,000 will be set soon by the San Joaquin River Water Storage District, Los Banos, Merced County, to be used as follows: $10,000,000 for the purchase of water rights and physical properties now held by Miller & Lux, agreement having been entered into between the District and Miller & Lux; $14,000,000 for the construction of the Friant Dam and power house, canals, structures, drainage system, etc. A. Kempkey, Hobart Building, San Francisco, and A. J. Wiley, Boise, Idaho, are consulting engineers, and Harry Barnes, Los Banos, is resident engineer. The project embraces 500,000 acres of land in Madera, Merced, Fresno and Stanislaus Counties.

Contract was awarded to United Dredging Co., Central Building, Los Angeles, who bid $.115 per yard for 2,000,000 cubic yards material to be removed for fill at Cabrillo Beach under Specification 1391, fill to be between Point Firmin Park and the Government breakwater.

San Francisco Bridge Co., Nevada Bank Building, San Francisco, who bid $.285 per cubic yard was low bidder to United States Engineer Office, Custom House, San Francisco, for dredging in Suisun Channel, California, involving 40,000 cubic yards dredging.

Philadelphia and Vicinity

BY H. C. DAVIS

An important letting was held at Trenton, New Jersey, on January 10. This work was handled by the State Highway Commission of New Jersey. The principal items to be done, and the approximate quantities of some of them are: Excavation, earth and rock, 172,000 cubic yards, concrete (except for pavement), 29,000 cubic yards, structural and other steel, 5,200 tons, asphalt paving, 18,300 square yards, granite block paving, 29,600 square yards. Montrose Contracting Co., Inc., Grand Central Terminal Building, New York City, was low with a bid of $3,244,951.00. Mason & Hanger Co., Inc., 17 West 60th Street, New York City, was second low with a bid of $3,320,562.50.

The Bethlehem Steel Co., Bethlehem, Pennsylvania, received a contract for a bridge over the Christian River at Market Street, Wilmington, Delaware. This contract was awarded on Friday, December 31. The bid was $237,257.29.

Our old friend George Thomas of the United States of America, who is at present in Rochester, New York, writes that everything is going fine and he is making good progress.

D. L. Sloane of 1911 63rd Street, Philadelphia, is doing some grading at Belmont Avenue, Ardmore, Pennsylvania. Rocco Piccirilli is the engineer.

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and who buys wire rope *only on past performance —*

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This satisfactory result has been duplicated in many other cases—by contractors throughout the country. The jacking method not only greatly reduces the cost, but is quickly carried out. There is no traffic interference. And the roadbed is left intact—no backfilling, no settlement.

The easy economical jacking method is applicable also to the placing of culvert pipe under roadways to give additional drainage, or to provide for gas and water mains, electric power line conduits or for any other purpose when an opening must be provided through an existing embankment.

Let us show you the profit possibilities of this new method.

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Write for Bulletin

An informative booklet, "Reducing the Cost of Culvert Placement," gives many interesting facts about this new method. Every contractor and highway official should have a copy. It's yours on request.

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SHOTS FROM THE FIRING LINE — Continued

D. E. O'Connell & Sons, 2511 New Road, Elsmere, Delaware, are finishing up a 22,500-cubic-yard grading job for the Eastern Malleable Iron Company of Wilmington, Delaware. Ed. O'Connell is pulling the levers and Harry Bell is keeping things hot.

Buckley and Banks of Philadelphia have just completed a 4600-cubic-yard excavation at Broad and Christian Streets. Peter A. Bucci had charge of this job. Toney Fini ran the shovel and Frank Marullo shoveled the coal.

James Porter of Philadelphia has been awarded a contract between Noble and Hamilton Streets on Broad Street.

There will be about 20,000 cubic yards to move. Work will start just as soon as conditions permit, because everyone is "rarin' to go" according to Jimmy Hayes, the superintendent.

C. N. Young, engineer, and C. P. Gensler, fireman, are working for J. T. Brogan Co. at Morrisville, New Jersey. This work is a 50,000-cubic-yard borrow for the Pennsylvania Railway.

Frank Sweet, engineer, J. J. Simmons, craneman, and J. E. Medley, fireman, are on a Bucyrus 70-C working for James McGraw Co. of Philadelphia at Farnhurst, Delaware. They are loading coal for the Pennsylvania Railway.

C. K. Rudy, engineer, and C. E. Ernrick, fireman, are also at Farnhurst, Delaware, working for the Vare Construction Co. They are digging a 50,000-cubic-yard cut for the Pennsylvania Railway.

Billy True, engineer, and Allen O'Brien, fireman, are with Thos. Hunter Company, Philadelphia.

N. O. Blair, engineer, and Thos. Purcell, fireman, are at Ardmore, Pennsylvania, working for Sunken Bros.

J. Hingsberger, engineer, and Paul Goff, engineer, are with Walter Allen Co., Darlington, Maryland.

Chas. B. Weber, John Bicket, Thos. Whitney, firemen and Jos. Keenan, engineer, are with L. V. Monaghan Co.

Mike Wash, engineer, and W. Kelley, fireman, are with Fish and Rutherford Co., Philadelphia.

Chas. E. Dugan, engineer, John Devery, fireman, are with Morrissy Bros., Philadelphia.

John Clark, engineer, and Joe McCabe, fireman, are working for Wm. Steele & Sons, Philadelphia.

R. O'Brien, engineer, and Jos. Anderson, fireman, are at Carmel, New Jersey, working for C. F. Sealbrook Co.

Bob Lindsay, engineer, and Andy Medley, fireman, are working for Patrick McGovern Co. on the Broad Street Subway, Philadelphia. They are on a Bucyrus 50-B.

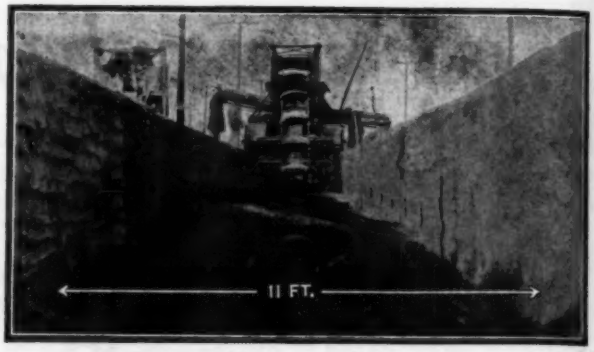
Southern States Notes

BY W. W. WHORLEY

J. L. Patterson, who has been handling an Erie for the Waldon Springs Quarry Company near St. Louis, Missouri, paid us a visit recently.

Dave Brown of Chattanooga dropped in to see us recently while returning from his work near Clearwater, Florida, and reports prospects encouraging on the West Coast.

S. A. Lacy has installed a Bucyrus 41-B high-lift shovel on his work with the G. M. & N. R. R., near Union, Mississippi. Mr. S. Hamilton, who is well known to old timers is behind the levers. On this same job Mr. Lacy is also using his Bucyrus 30-B Diesel dragline.



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Every year hundreds of Buckeye Trench Excavators join their fellow Buckeyes in digging the world's trenches.

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The Rotary Auxiliary Cutter gives every Buckeye an almost unbelievably broad range of cutting widths. This feature is patented, therefore, obtainable only with Buckeyes.

With this Cutter the owner of a Buckeye actually owns several ditchers in one. In other words, *one* Buckeye has the working capacity, therefore, the earning ability, of several ordinary trench excavators. Why buy two when one will do?

This superior digging ability invariably enables the payment of two estimates within the time usually required for one with the ordinary trenching machine.

Mighty interesting, isn't it? Ask for more details of this and other exclusive and equally valuable operating features of Buckeyes.

The Buckeye Traction Ditcher Co.

Manufacturers of Trench Excavators (both Wheel and Chain-and-Bucket Types), Pipe-Line Trench Excavators, Tile and Open Ditchers, Back-Fillers, Pipe Screwing Machines, Curb Diggers and Clay Diggers.

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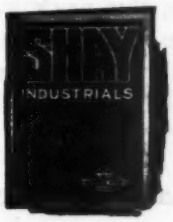

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Locomotives that need extensive shop facilities and expert machinists for repairs, add many dollars to maintenance and repair costs.

Numerous Shays are working on operations where no machine shops or drop pits are available. The owners say that the Shay engineers themselves make the necessary repairs and adjustments—thus keeping locomotive maintenance costs and out-of-service time at the very minimum.

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SHOTS FROM THE FIRING LINE — Continued

The H. C. Spinks Clay Company of Puryear, Tennessee, are moving overburden at their pit with a Bucyrus 31-B shovel. Mr. L. L. Spivey of Anniston, Alabama, is handling the shovel, and it is a safe bet that he will keep the dirt moving.

Arthur Taylor advises us that he is making nice estimates with his Bucyrus 20-B shovel on a heavy piece of highway construction in Etowah County, Alabama. Vader Roberts is piloting the Bucyrus 20-B.

J. T. Moses is loading rock with a Bucyrus 78-C for the Ainslie Lime Rock Company near Macon, Georgia.

F. L. Busby is loading shale with a Bucyrus 20-B electric shovel for the Phoenix Portland Cement Company in North Birmingham.

W. N. Hubbard is opening up the new limestone quarry for the Phoenix Portland Cement Company with a Bucyrus 100-B electric and reports some heavy digging.

Sam Spooner is loading rock with a Bucyrus 30-B at Leeds, Alabama, for the Atlas Portland Cement Company.

Quite a number of contractors attended the letting of the Tennessee State Highway Department at Nashville, Tennessee, in December. Awards were made as follows: 112 A and B, Gibson & Carroll, to Hinson Brothers, Muskogee, Oklahoma; 112 A, Gibson Bridges, L. J. Utley, Mt. Vernon, Indiana; 112C, Carroll, R. E. Martin, Selmer, Tennessee; 140C, Meigs, R. A. Scott, Selmer, Tennessee; 155A, Lincoln, Alley Construction Company, Bristol, Tennessee; 310C, Unicoi, Hughes & Ray, Newland, North Carolina; 343, Crockett, S. R. Hall, Newbern, Tennessee; 347A, Lauderdale, R. E. Martin, Selmer, Tennessee; 347B, Lauderdale, Cresap Brothers, Humboldt, Tennessee; 347 A and B, Bridges, Lauderdale, Montgomery & Parker, Rockport, Indiana.

The Coastal Construction Company of Chicago and St. Petersburg are engaged in dredging yacht basins and slips at Yankeetown, Florida. This work, which will take them several months to complete, is being done with a small P. & H. dragline.

Wm. T. Lundquist of Boise, Idaho, and Henry Hudging of Long Beach, California, are each running an 8-hour shift on a Class-24, 115-foot boom Diesel-Electric Bucyrus dragline, building levee near Marked Tree, Arkansas.

We are very sorry to announce the death of Mr. James L. Brierton, Vice-President and General Manager of the Central Iron & Coal Co., of Holt, Alabama. His death followed a brief period of illness in a local hospital. Mr. Brierton leaves a wide circle of acquaintances, both in his own company and among the steel and mining industries in the Alabama district.

The many friends of Mr. E. P. Russell of the Tennessee State Highway Department will be shocked to learn of his death while in charge of a construction crew recently. Death was caused by a delayed explosion due to the failure of a charge to explode promptly when ignited. Mr. Russell had been with the Highway Department for about four years, and had previously followed construction work in various parts of the South.

St. Louis Items

BY A. B. KOENIG

Tom Walsh of the Walsh Construction Co. was with us a day. They bid on the Missouri Pacific double-track work and were a little high. They have enough work for their outfits on the Pennsylvania, Big Four and Hocking Valley Railroads.

BOILER REPAIRS or REBUILD

Are you repairing your boiler for next season? Doing this work in the field with inadequate equipment and limited facilities? Will these repairs insure a full season's work at full capacity without interruption?

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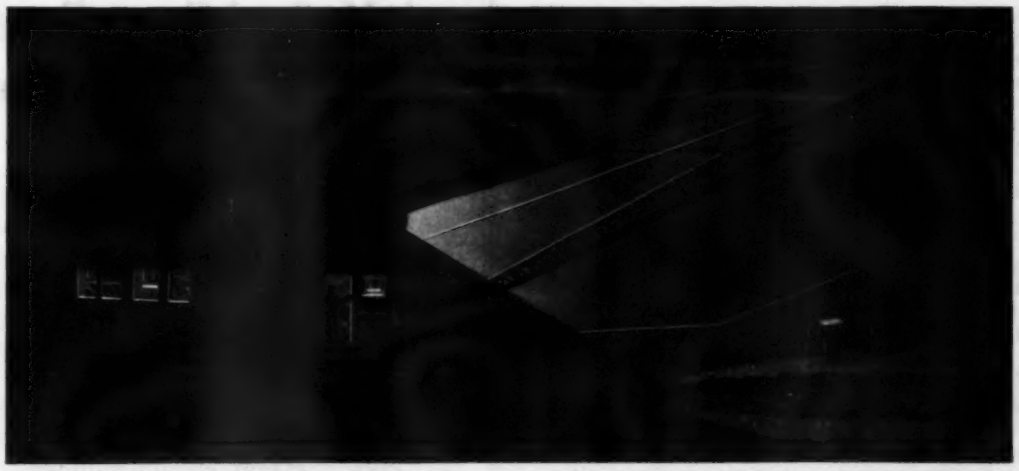


Monighan Excavator No. 448 owned by Winston Bros., Minneapolis, excavating at night near Lewiston, Idaho. Electric current for light supplied by Kohler Electric Plant.

Light—the Way to More Profits

Remarkable, how a Kohler Automatic Electric Plant increases profits. Installed on excavating machinery it supplies electric light for night work. Contractors can thus—

—double the output per machine;

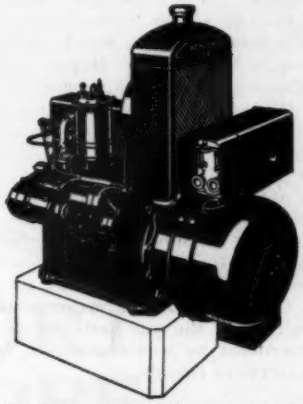
—decrease by half the overhead expense per job;

—meet completion dates on time;

—give better, quicker service to their clientele.

Kohler Electric Plants are *sturdy*, to stand the jars and shocks; *powerful*, to supply abundant electric light for the entire scene of night operations and the camp, and electric power for drills, compressors and other tools; *compact*, to fit into the limited space available on the equipment.

Write for our booklet and prices.



Kohler Automatic, Model "D," 1500 Watts

SPECIFICATIONS

ENGINE — Valve-in-head, four cylinder, four cycle; 2-inch bore, 3-inch stroke, speed 1000 r.p.m.
HORSEPOWER (Gas Engine) — 3.
LUBRICATION — Pressure pump forcing strained oil to all main bearings, splash to other engine bearings.
COOLING — Water cooled, each cylinder entirely surrounded by water.
CONNECTING RODS, CAMSHAFT, CRANKSHAFT AND ROCKER ARMS — Drop forged, special steel, heat treated.
GOVERNOR — Mechanical throttling; proportions fuel used to load being carried.
STARTING BATTERY — Small battery of automobile type for starting only; kept automatically charged.
FUEL SUPPLY — Vacuum tank on plant; connected to main supply tank, to draw fuel for plant.
GENERATOR — Four-pole, compound wound, 110 volt D. C., 1500 watts.

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SHOTS FROM THE FIRING LINE — Continued

The Dunham Construction Co. of St. Louis, with an offer of $778,141, was low among ten firms which presented bids for the construction of three buildings at the Howard's Bend Waterworks for City of St. Louis. City engineers had estimated the structures would cost $900,000. Other bidders on the waterworks buildings were: Hiram Lloyd Building and Construction Co., $814,591; Murch Bros. Construction Co., $841,500; Frazier-Davis Construction Co., $793,713; Humes-Deal Co., $782,650; Fruin-Colnon Construction Co., $822,655; E. A. Steininger Construction Co., $870,880; James Black Masonry & Contracting Co., $919,142; William MacDonald Construction Co., $811,402; and McCormack-Combs Construction Co., $806,916.

The Massman Construction Co., Kansas City, were awarded contract by the Missouri Pacific Railroad for laying an 8-inch water pipe line from the North Little Rock treating plant to the steel tanks on Lincoln Avenue and the south of the station in Little Rock, Arkansas. Marvin Jones is in charge of this job.

T. H. Cutler of Jefferson City, construction engineer of the Missouri State Highway Department, was promoted to be chief engineer to succeed B. H. Piepmeier, whose resignation was accepted by the Commission. Mr. Piepmeier has resigned, effective January 1, to take a place in the organization at Kansas City of Theodore Gary, ex-chairman of the Commission. Mr. Cutler, a Republican, came to the highway department from Illinois in March, 1923 as a project engineer on the Joplin Division. In March, 1925, he was appointed by Mr. Piepmeier as assistant chief of construction, and in April of this year became head of the department. His experience is extensive. He was graduated from the University of Kentucky in 1903, and for two years was a draftsman with the Chicago & Alton Railroad. For the next four years he was employed by several steel companies as a construction engineer, three of which he served in the Gary organization as assistant chief engineer and superintendent of construction for the United States Steel Company. He was city engineer of Gary, Indiana, for eight years. In the war Mr. Cutler served as a major in the chemical division. From the close of the war until the time he joined the Missouri department he was engaged in highway construction as a contractor in Illinois.

Frank McCaughey of the J. J. McCaughey Co., Chicago, took a trip to St. Louis and reports 1926 a good year for his firm. He expects to beat it in 1927.

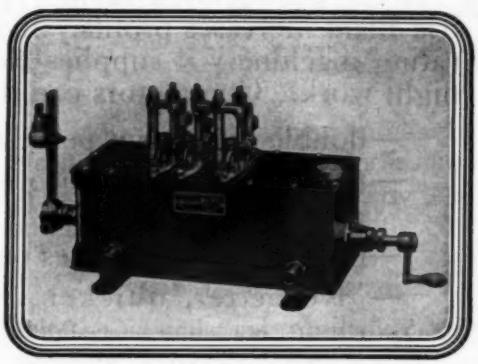
Bids on 14 city paving projects were opened by the Board of Public Service, the low bids totaling $158,952, less than the estimate of city engineers. The low bids were: Howard Street, Jefferson Avenue to Glasgow Avenue, Granite Bituminous Paving Co., $24,828; Section of Pennsylvania Avenue south of Sidney Street, Granite Bituminous Paving Co., $8960; Robert Avenue, Virginia Avenue to Vermont Avenue, Granite Bituminous Paving Co., $6798; Labadie Avenue, Clara Avenue to Goodfellow Avenue, Bridges Asphalt Paving Co., $23,871; Greer Avenue, Clara Avenue to Goodfellow Avenue, M. L. Flinn Paving Co., $21,401; Section of Lea Place, south of Lee Avenue, Trinidad Asphalt Manufacturing Co., $3953; Park Lane Avenue, McLaran Avenue to Melrose Avenue, Trinidad Asphalt Manufacturing Co., $23,882; Section of Summit Place, south of West Florissant Avenue, C. A. Moreno, Inc., $6,573; Odell Street, Watson Road to Clifton Avenue, Webb-Boone Paving Co., $8,694; Tilden Avenue, Kings Highway southwest to Iron Street, Webb-Boone Paving Co., $5,175; Section of Cologne Avenue, south of Wilcox Avenue, Eyerman Construction Co., $2,191; Section of Dresden Avenue, south of Wilcox Avenue, Eyerman Construction Co., $2,707; Section of Taylor Avenue, south of Manchester Avenue, Alfred Lewald, Inc., $12,626; Natural Bridge Avenue, Kingshighway Boulevard to Norwood Avenue, Skrainka Construction Co., $7,288.

A McCord Force Feed Lubricator Will Keep Your Shovel on the Job

A McCord force feed lubricator installed on your steam shovel now will insure more continuous operation. Dependable force feed lubrication prevents shutdowns and delays, it gives more hours on the job.

McCord force feed lubricators are used as standard equipment by the largest and best-known steam shovel builders and they will be installed on any shovel at your request.

Put a McCord lubricator on now and be assured of dependable lubrication for the life of your shovel.



McCord Class B. A. Force Feed Lubricator

McCord Radiator & Mfg. Co.
Detroit, Michigan

McCord
force feed
Lubricators

In writing to McCord Radiator & Mfg. Co. please use post card bound in the center of this number.

WILLIAMSPORT WIRE ROPE

Telfax Tape Marked —Factory Certified

IS STANDARD EQUIPMENT ON

KEYSTONE DRILLERS and EXCAVATORS

This message is broadcast to 1,368,000 people using wire rope because it deserves to be. You men who risk your lives with ponderous machinery are entitled to the protection you get in the use of Williamsport Wire Rope and a manufacturer who thus equips his machinery is thinking more of your safety than the price he pays. He believes in safe-guarding you in every way available and Williamsport is the only wire rope made, all grades of which is marked with plain English proof. Such manufacturers deserve your confidence. You have a right to be nervous about the tensile strength of ropes not so marked. The good name of any manufacturer is not a protection against mistakes — but the wrong grade of Williamsport Wire Ropes can be instantly detected by anyone. Others cannot.

Isn't this protection worth demanding? If you think so, insist upon Williamsport equipment on the machines you use for your own protection.

WILLIAMSPORT WIRE ROPE COMPANY

Main Office and Works
Williamsport, Penn.

General Sales Offices
Peoples Gas Bldg., Chicago

In writing to Williamsport Wire Rope Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Shelby Borham is with the J. J. McCaughey Co. on their Pennsylvania Railroad work near Collinsville, Illinois.

Yale & Reagan have an outfit with the Walsh Construction Co. on Section 6 of the Hocking Valley Railroad near Chillicothe, Ohio.

The Illinois State Department of Public Works and Buildings and the State Division of Highways are progressing rapidly on the building program for this year, under the $100,000,000 bond issue. Various routes are under consideration, and it is probable that the program will be outlined shortly and contracts let so that work may begin at the earliest possible date in the spring. A large number of delegations have visited Springfield to make requests for road construction, and others will be heard from before the program is decided upon definitely. Indications are that the building program for 1927 will consist of approximately 1,000 miles.

W. P. McGeorge & Co., Pine Bluff, Arkansas, were awarded contract by the Missouri Pacific Railroad for grading, bridging and culverts on a 7-mile extension out of Nashville, Arkansas. This firm is also working on a 12-mile extension for the Missouri Pacific Railroad between Hot Springs and Hawes, Arkansas.

Cameron, Joyce & Co. were awarded 700,000 yards of work by the Santa Fe Railroad near Mulvane, Kansas. About 400,000 yards of heavy borrow and 300,000 yards of shovel work in this job. They will sublet the team work, and probably do the shovel work with their own outfit.

Wm. Gardner, 5517 Arthur Avenue, St. Louis, reports 12 teams, wheeler and fresno outfit idle.

H. K. Rhoads was awarded contract for street paving in Lincoln, Illinois.

The John L. Humbard Construction Co. of Knoxville, Tennessee, started on 23 miles of the Mississippi Valley Highway out of Tongaloo, Mississippi. Guy Davant is superintendent in charge.

The Southern Illinois Quarry & Construction Co. were awarded contract for paving a new district in the residential section of Duquoin, Illinois, and will begin work as soon as weather permits.

Progress is being made on the new line being constructed by the Chicago, Rock Island & Pacific Railroad between Amarillo, Texas, and Liberal, Kansas, according to a report made by that road to shippers. The new line is now being constructed into Ponca City, Oklahoma, and is being operated as far down as Tonkawa.

The Stewart Construction Co. were awarded contract for a one-million bushel addition to the Wabash elevator in North Kansas City by the Wabash Railroad Company. The Wabash Railroad will also expend $250,000 on additional trackage in the enlarged terminal yards in North Kansas City.

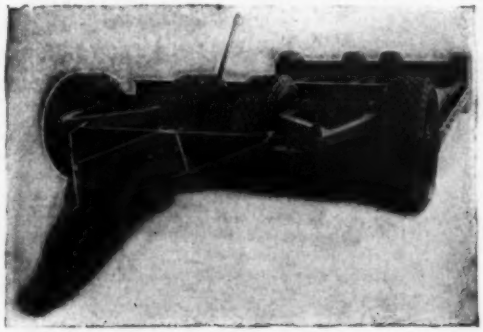
J. W. McMurry who is always springing something new on his friends came to town with a brand new one the other day on his return from the South. Mac was awful thirsty while looking over some new work (wanted water, of course) and asked the colored chauffeur who was driving the machine if there was any place he could stop and get a drink. "Yes, indeed, boss," answered the chauffeur smiling, "we will stop at the next crossing. I knows a man there that has some of the finest 'roasting ear wine' in the country." Mac failed to tell us whether he stopped or not. If he did it must have been pretty good as he kept smiling while telling the story.

Ross, Wogan & Co., Columbus, Mississippi, have some nice grading work to let on Frisco Railroad in Mississippi and Alabama.

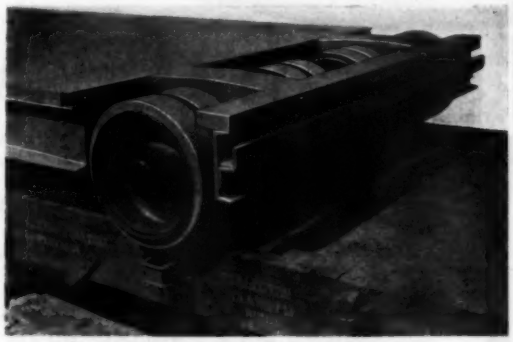
Haul Your Shovels with Your Own Trucks — and a Transport

TRAILER

(20 Tons to 50 Tons Capacity)



(Built to Carry Steam Shovels)



(Rear End Construction for End Loading)

Ask for Bulletin

BUCYRUS COMPANY

SPECIALTY DEPARTMENT

SOUTH MILWAUKEE, WIS., U. S. A.

FOR YOUR CONVENIENCE

1. We have compiled a list of manufacturers of equipment used in the field of excavation.
2. We have arranged this list on the plates of an addressing machine so that we can quickly and cheaply write each one.
3. We have placed a post card in the center of this magazine for you to check and return to us.

If you are interested in equipment

We will ask each manufacturer on the list checked to send you his catalog — or — we will send you the list with addresses, on letter head.

Just return the card (the one with the border in the center of the book)

THE EXCAVATING ENGINEER PUBLISHING COMPANY
South Milwaukee, Wisconsin

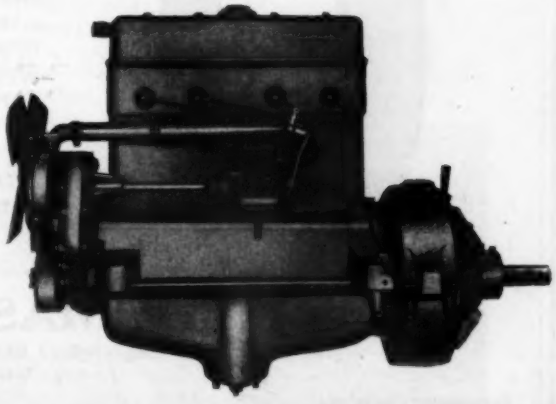
TWIN CITY ENGINES

Announcing our new Model FE 4½" x 6" 4-cylinder valve-in-head engine

OUR new Model FE engine was shown at the Chicago Road Show in January and caused much favorable comment.

This is a medium speed rugged type of engine for industrial use. It is valve-in-head type and has many new and advanced features of design, assuring long life and a minimum upkeep.

Model FE is a worthy addition to the line of Twin City Engines manufactured in sizes 35 to 140 h. p. Write for literature and specifications.



Minneapolis Steel & Machinery Co.
Minneapolis, Minn.
Heavy Duty Engine Manufacturers Since 1903

"BUILT TO DO THE WORK"

In writing to Minneapolis Steel & Machinery Company please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Approximately $4,004,000 will be spent during 1927 for work on the new St. Louis waterworks on the Missouri River. This amount, with $5,700,000 already expended will bring the total to $9,704,000 at the end of the year. Of the $12,000,000 authorized by the 1923 bond issue election for new waterworks, $11,172,000 already has been appropriated, and $6,939,000 has been realized from bonds sold. When completed about January 1, 1929, the new waterworks will have a capacity of 80,000,000 gallons daily. Ultimately the capacity will be 160,000,000 gallons daily. Contracts to be let this year include a $600,000 settling basin, a $75,000 secondary coagulent basin, and a $200,000 clear water basin.

R. J. Reid of Reid & Lowe, Birmingham, Alabama, returned from a visit to Battle Creek, Michigan, his former home. This firm has four track gangs at work at Kimbrough, Alabama, and two out of Pensacola, Florida. They are also repairing timber bridges and trestles, and building a roundhouse and yard at Pensacola, Florida. They have had a very nice year.

M. Ed. McGuire bought a new shovel which he added to his outfit at work on the Pennsylvania Railroad near Collinsville, Illinois. Mac spent Christmas with his family in Indianapolis, Indiana.

Richard Costello of Costello Bros., Brownlow Building, Knoxville, Tennessee, says they have several good steam shovel outfits idle and wants a job for them.

Winston-Dear Co. have an outfit on Winston Brothers Co. new double-track work on Missouri Pacific Railroad in Missouri. Jim Winston is in charge.

Harolson & Johnson have a machine outfit at work on state highway near Pinckneyville, Illinois.

E. B. Styles Contracting Co., 35 North Dearborn Street, Chicago, report a couple of good bridge and concrete outfits idle that they can place on work immediately.

Jim Dougherty and E. J. Slane of Morris & Dougherty, St. Paul, Minnesota, were with us a couple of days looking over things in this part of the country. By the way, Jim, many thanks for the elegant photo you sent us Christmas.

Winston Bros. Co. were awarded three sections, approximately 30 miles of double-track work between Labadie and Osage, Missouri, by the Missouri Pacific Railroad. This is all heavy rock work, about 2,000,000 yards. They expect to do nearly all of the work with their own outfits and are figuring on having 10 or 12 camps. As usual with the Winston's, they made a quick start. Contract was awarded January 3rd. They had several outfits on the job and at work January 4th.

Emery S. Hill of Winston-Hill spent the holidays in Minneapolis. They are going to have an outfit on one of the new sections in Missouri recently awarded to Winston Bros. Co. by the Missouri Pacific Railroad.

The Luck Construction Co. are making good progress with their reservoir work at Amarillo, Texas.

H. C. Bothford has his outfit at work on highway at Muscotah, Kansas.

The W. C. Hill Construction Co. report a good year. This firm put in quite a number of new tracks and switches in the neighborhood of Kansas City. They will also start on a Missouri highway grading job soon as weather permits.

Maloy & Fowler, 416 Globe Building, St. Paul, Minnesota, have a small shovel outfit idle near Chicago that they can place on work immediately.

Why Asbesgraphite Costs Less

ASBESGRAPHITE Brake and Friction Blocks cost less because they will outlast any type of brake and clutch lining by 2, 3 or even 5 times.

Heat, oil, dirt or moisture, all of which affect ordinary lining or blocks, do not affect ASBESGRAPHITE.

The graphite composition makes it self-lubricating. The asbestos makes it heat-resisting. The combination makes a block or lining that holds tenaciously, yet with a soft, velvet-like grip, upon the lightest contact.

With heat and wear eliminated, it is little wonder that ASBESGRAPHITE is the longest lasting and, therefore, the lowest cost lining for all brake and friction purposes.

The cost is so negligible, you can't afford to pass up our offer of co-operation with you in an investigation of ASBESGRAPHITE. Write us today.

Manufactured by

THOMAS L. GATKE

Chicago Office: Railway Exchange Building
Factory: Winona Lake, Indiana

We manufacture asbestos brake and friction products for all makes of shovels, cranes, dredges, dragline excavators, hoists and other kinds of equipment.

ASBESGRAPHITE
ASBESTOS COMPOSITION

"Ektag", the Gatke Folded and Compressed Asbestos Brake Lining, is carried in stock for immediate shipment.

In writing to Thomas L. Gatke please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

A. F. Crenshaw will be in charge of Winston Bros. concrete work on the Missouri Pacific Railroad.

Contractors when in want of work or labor for their outfits get in touch with the Koenig Labor Agencies, 612 Walnut Street, St. Louis, Missouri, or 501 Delaware Street, Kansas City, Missouri.

O'Hagan & McVicar, Railway Exchange Building, Kansas City, Missouri, have 85,000 yards of grading to sublet on state highway near Louisiana, Missouri.

Walter H. Denison will finish his work on the Chicago, Rock Island & Gulf Railroad out of Amarillo, Texas, this month. Denison's monthly estimate for November was one of the largest issued by the Rock Island Railroad in years.

Canada

Toronto and Vicinity

BY C. F. ENGLAND

Curran & Briggs of Orillia, Ontario, have been awarded contract for construction of a twin box concrete sewer by the city of Hamilton at a price around $140,000.

A large number of contractors and engineers from Ontario visited the Road Show in Chicago, making the usual inspection of various equipment.

The new councils in the different municipalities have been installed, and it will not be long now before they will be preparing for this coming season's work. Some of these places appear to have a more or less extensive program, while others seem to be inclined to keep down the tax rate, with the result that there will not be so much done in these latter places.

Construction work on the Welland Ship Canal will be more or less at a standstill during the winter months, but it should not be long now before the contractors will be getting things ready for the spring start.

Winnipeg and Vicinity

BY D. V. REDDIN

Canadian National Railways are operating a Bucyrus 70C at Criley, Ontario. Mr. J. L. Johnson is the operator.

Railway and general contractors are optimistic about the amount of construction work planned for Western Canada during 1927.

Empire Mining and Metallurgical Congress will hold sessions at Winnipeg, Estevan, Calgary, Vancouver and other points. Visits to mining districts, also iron and steel plants, are on the tentative program.

The Mountain Stone Company, Fort William, Ontario, have shipped broken stone to Detroit and Cleveland. Plant may be extended this year to take care of business offered.

NOTICE!

Index for The Excavating Engineer
Vol. XX — 1926

May be obtained on application to

THE EXCAVATING ENGINEER
SOUTH MILWAUKEE, WISCONSIN

USE THE POSTAL INSERT ENCLOSED WITH THIS ISSUE

Winter Drilling

ON many rock jobs it is an advantage, if not a necessity, to continue drilling operations throughout the winter, even though the balance of the outfit may shut down for a month or two. This will provide drilling and blasting ahead for the Spring rush.

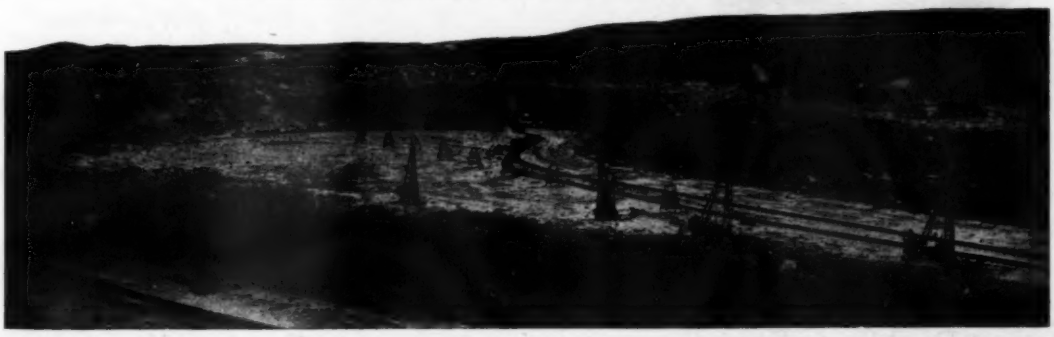
Winter drilling has no terrors for Cyclone No. 14 Big Blast Hole Drills. Their positive control in the form of a back-geared spudder, a geared hoist and worm-and-gear cable feed is not affected by wet and freezing weather as is the case with friction drives. Furthermore, the gears are Cast Steel, which does not become brittle in extremely cold weather as does cast iron.

These are some of the reasons why Cyclone Drills dominate in localities where the winters are severe, such as the Lake Superior Iron Ore district and in the Canadian limestone quarries. The illustration below, taken in February, shows seven of the twelve Cyclones used by Canada Crushed Stone Company at their Dundas, Ontario, quarry.

Our 100-page catalogue "BIG BLAST HOLE DRILLS" should be in the hands of every open-cut rock mover. Ask for it.

THE SANDERSON-CYCLONE DRILL CO., Orrville, Ohio, U.S.A.

Eastern and Export Office: 30 Church Street, New York, N. Y.



In writing to The Sanderson-Cyclone Drill Co. please use post card bound in the center of this number.

Work on 287-Mile Highway in Japan to Start Soon

The budget of Taiwan (Japan) for the year beginning April 1, 1926, contains an item of $6,000,000 for the construction of a highway 287 miles long which will include the construction of 21 large and 510 small bridges, also 1,140 viaducts and culverts, according to the United States Department of Commerce. The first part of the construction program is to be spread over a period of ten years. The work will require an additional period to carry it to completion.

Contracts for the work will be let only to Japanese firms or to foreign firms having a responsible representative in Taiwan amenable to laws there.

Four Out of Ten of Us Work for Pay

How many people work? The National Bureau of Economic Research gives an answer to that question in a recent report on population. The Bureau estimates the population of the United States on July 1 of last year at 113,454,000. Of these 35,000,000 are children under fifteen, not employed. Another 35,000,000 are adults not gainfully employed, most of whom are engaged in the arduous labor of housekeeping. A third group of 33,500,000 are working for others. This leaves 9,600,000 who are employers or are in business on their own account.

The proportion of workers grew in war time but has dropped back, so that it stands now about where it did fifteen years ago. Some 38 per cent of the population are "gainfully employed," the other 62 per cent being about equally divided between adults and children.

There has been, the Bureau believes, a shrinkage in the number who work for themselves, due to the corporate growth in business. These "entrepreneurs," as the report calls them, numbered 9,833,000 in 1909 and 9,657,000 in 1924, despite a 25 per cent increase in population.

But how does one define employer? Is the president of the United States Steel Corporation an employer or one of the employed? And if he is one of the employed, how many employers of labor do you know? Corporations have swallowed up most employers save farmers, proprietors of beauty shops (now called beauticians), bootblacks (soon to be called booticians), and perhaps an occasional grocer and butcher. Even the littlest merchant now is apt to be a corporation.

ONE PRINCIPLE FOR TWENTY YEARS

PITTSBURGH

The load and moving parts of an Extension Side Dump Car are balanced throughout the dumping operation.

This means minimum power and cost to operate.

These cars will be furnished in any cubical capacity from 20 to 50 yards, level full, or approximately 28 to 70 yards normal loading.

CLARK CAR COMPANY
BALANCED DOOR DUMP CARS
PITTSBURGH, PA.

San Francisco, Rialto Bldg. — Chicago, 400 Railway Exchange Bldg. — Richmond, Va., Am. Nat. Bank Bldg.
New York, 52 Vanderbilt Ave. — Boston, 683 Atlantic Ave.
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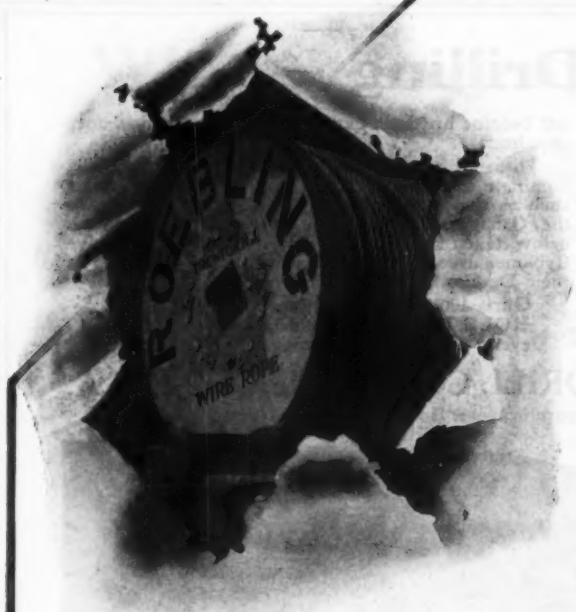


Roebling

Blue Center Steel Wire Rope *is selected by the Bucyrus Company as a part of their standard equipment because of its long life in service.*

A superior grade of steel furnished in constructions of proven fitness for all classes of dredge, dragline and excavating machinery.

Catalog A-500

John A. Roebling's Sons Company — Trenton, New Jersey

TRADE NOTES

Electrification on French Railways

Three of the five leading French railway companies are pushing the work of electrification on certain parts of their lines; the programs for the Southern, the Paris & Orleans and the Paris, Lyons & Mediterranean being for nearly 2000 miles each. On the Southern Railway one section of 190 miles is completed, one of 146 miles is under way, and with other sections, was completed in 1926. This company is building sixty electric locomotives at its own shops. The Paris & Orleans has the work completed on about half of its line from Paris to Brive, 312 miles, and has three other sections aggregating 400 miles under way. Steam power plants will be used for one 167-mile section, all the others being served by hydro-electric plants. It has 200 electric locomotives and 80 motor cars under contract. The Paris, Lyons & Mediterranean Railway has work in progress on seven sections aggregating 600 miles, exclusive of 200 miles of suburban and local lines around Paris. The Northern Railway and Eastern Railway have not yet begun work on their projects. On the state railways the electrification is limited to the Paris lines.

Department of Commerce Working on a Non-Destructive Test for Wire Rope

A test which could be applied to steel hoisting rope to show whether it is in safe condition or not, and which would not require the cutting of a sample from the rope, would be of great value.

For some time the Bureau of Standards, Department of Commerce, has been investigating the possibility of applying some form of magnetic test to wire rope to determine its condition, as it is known that breaks in the individual wires, worn places, etc., as well as the stress on the rope, affect its magnetic permeability.

The Bureau found that wear increases the magnetic permeability for low magnetizing force, and decreases it for higher values, in other words opposite readings are secured, depending on the magnetizing force employed.

The complete results of this investigation are given in Scientific Paper No. 510 of the Bureau of Standards, copies of which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. at 5 cents each.

Radiators *any size any type* from 1-H.P. up

Radiators of any size, 1 H.P.—1000 H.P. or more; Tubular or Cellular—Sectional or Conventional Cast—Sheet Metal—or if preferred only the cores or sections.

MODINE MANUFACTURING CO., RACINE, WIS.

MODINE RADIATORS

THE NORDBERG PATENTED TRACK SHIFTER

A Time and Money Saver for Quarries, Waste Dumps, Open Pit Mines, Construction Work, Track Ballasting, Behind Steam Shovels.

This machine with its operator and a few laborers will replace your large and expensive track gang. Pays for itself in a few months out of labor savings.

Let us send you pamphlet GR-8

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

QUALITY

The special iron used in the manufacture of Taylor-Mesaba Chain, which is rolled to our specifications, is free from any steel or scrap.

Contractors, Quarries, Cement Plants, Mines, etc., who keep actual yardage records on their chain, generally standardize on Taylor-Mesaba for their dragline and shovel chain requirements.

They pick Taylor-Mesaba Chain, not on its initial cost but on its actual cost.

TAYLOR MESABA

"Quality at Low Cost"

S. G. TAYLOR CHAIN CO.

Established 1873

502 Marquette Building CHICAGO, ILLINOIS

Above is an illustration of a 1¼-inch bar etched, showing the special piling of the iron used in Taylor-Mesaba Chain.

TRADE NOTES — Continued

The S. G. Taylor Chain Company, 140 South Dearborn Street, Chicago, have just issued a new Taylor-Mesaba single and double sling chain price list. Load diagrams are part of this price list, which may be obtained by addressing the manufacturer.

The Second Annual Southwest Road Show and School will be held on February 22, 23, 24 and 25 in Wichita's Municipal Coliseum at Wichita, Kansas.

The name of the Armco Culvert & Flume Manufacturers Association has been changed to Armco Culvert Manufacturers Association.

This change of name does not imply any change in policy. The Association will continue to devote its efforts to research in all matters relating to drainage and irrigation, and to educational publicity for making this research known to those whom it will benefit.

At Fenghwa, Chekiang Province, China, a motor bus company has been organized, which has completed the survey of a route between Hsiwu, Husiuliu, Chowkiatungmen and Takiao, a distance of 20 li for the building of motor road. Report has it that construction on this work will be started very soon. Perhaps many of us look upon motor bus service as more or less of an American institution, and the rickshaw as the proper means of transportation in the Orient. However, service between Kiangkow and Siaowangmiao has been improved by the Hwie Lu Motor Bus Service Bureau. Light cars were running on this section during 1926 for a charge of about $.40 per passenger.

BOOK REVIEWS

We shall be glad to review such books and catalogs as are sent us

TRUSCON PRESSED STEEL BOXES IN PLATFORMS — ***The Truscon Steel Company, Youngstown, Ohio,*** have just issued two new catalogs upon their boxes and platforms. This company, in addition to their factory forms described in this catalog, make many products for the contractor, such as concrete forms, metal lathe, steel joists, etc.

BABBITT METAL DATA — 3½ x 6¼, 20 pages. ***The Hoyt Metal Company, St. Louis, Missouri,*** have just published a little booklet giving instructions for babbitting bearings. information is given concerning lubrication, load, speed and temperature, as well as instructions for casting and fitting. Copy may be obtained from the manufacturer.

The Bureau of Mines, Department of Commerce, Washington, District of Columbia, have just issued their Bulletin No. 240. This bulletin contains results of investigation of electric shot firing in mines, quarries and tunnels. L. C. Ilsley and A. B. Hooker are the authors of the bulletin. Copies may be obtained from the Bureau of Mines.

The National Lime Association, Washington, District of Columbia, has just issued a bulletin entitled "The Value of Hydrated Lime as a Filler in Asphalt Paving Mixers." This publication by Prevost Hubbard and F. C. Field outline the investigation carried on recently and the conclusions reached by the investigators. Copy may be obtained from the National Lime Association.

HAYWARD DRAGLINE BUCKET — ***The Hayward Company, 50 Church Street, New York,*** announce in their pamphlet, No. 66-A, a new Hayward dragline bucket.

Your Cable Costs will be Lower—*no "Side Leads"*

All straight cable leads on a WILLIAMS Bucket — all the closing sheaves work in one plane.

This means far less friction at the sheave pins — more digging power. And less wear on cables and sheaves. Write for description.

G. H. Williams Company
603 Haybarger Lane, Erie, Pa.
Branch Offices:
New York Pittsburgh Chicago

WILLIAMS
FAST-DIGGING BUCKETS
All Parts Guaranteed Against Breakage

Palmer Folded Brake Lining

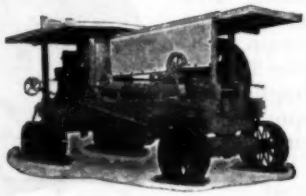
gives 100% service down to the very last wafer. Economical, smooth-gripping and unfailing in emergency service. Impervious to gas, water and oil, and unbelievably long-lived.

PALMER ASBESTOS & RUBBER CORP.
2741 Clybourn Ave. CHICAGO

Clipper Drills Are Always Ready

If the drill breaks down, the blasting operations are stopped, and the output of the quarry is lessened.

A simple, rugged and constant production drill is required in the quarry.



The new type *Loomis "Clipper" Blast Hole Drill* is this type.

Write for further information.

THE LOOMIS MACHINE CO.
(*Established 1842*) K Street, Tiffin, Ohio

Ask If We Can Save You Money

Hercules Explosives are used in most of the mining and quarrying districts of the United States. The regular grades are recognized as standard equipment. The special grades have been the means of reducing explosives costs for many operators who have given them a trial.

If you have not already determined whether one of the Hercules Special Dynamites—No. 1 and No. 2 for open work and No. 3 for underground—are adapted for your work, we recommend an examination of your blasting operations. Where these special powders are suitable they show an appreciable saving for the user. Perhaps the proper one of them can do so for you.

The same thing can be said of Hercoblasting, a method for shooting black powder in column loads with Cordeau Bickford, in well drill holes that often saves as high as thirty percent on explosives costs in open-pits and quarries.

We are gradually adding new names to the long list of companies that are increasing their profits through savings brought about by Hercules service, or Hercules explosives, or both.

Naturally we extend our service first to those who ask for it. It will cost you nothing to ask, and it may prove to be a profitable request.

HERCULES POWDER COMPANY

(INCORPORATED)

Dynamite—Permissible Explosives—Blasting Powder—Blasting Supplies

949 KING STREET, WILMINGTON, DELAWARE

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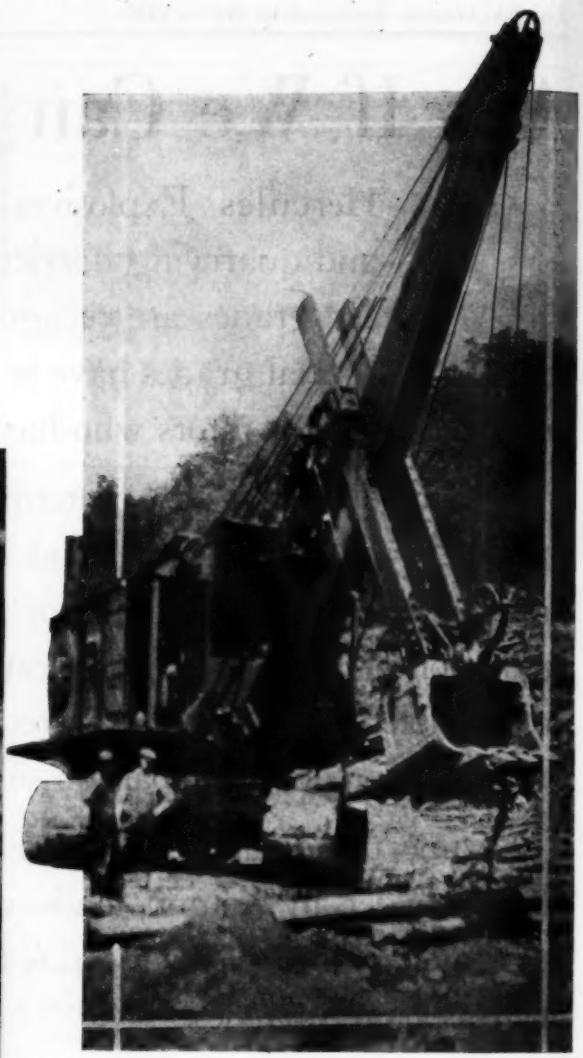
In writing to Hercules Powder Co., Inc., please use post card bound in the center of this number.



Top Left — Office and Commissary of the Company.

Top Right — Showing How a Chain Was Placed Around a Couple of the Dipper Teeth in Using the Machine as a Crane.

Lower Left — A Glimpse of the Rough Character of Digging Encountered.

Lower Right — Looking eastward along dam from the mountain above. The pump boats are busy sluicing down the material, while another trestle is being erected to build the next lift.

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